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EPIDEMIOLOGIC PECULARITIES OF TOXOPLASMOSIS IN BUKOVYNA'S WOMEN OF REPRODUCTIVE AGE

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The rate of toxoplasmosis invasion in Bukovyna's women of reproductive age makes up 81,3 % with the predomination of the rural population (87,3±0,58 %) versus (71,4±1,11 %) urban inhabitants. The rate of detecting seropositive persons based on toxoplasmosis does not differ substantially in age groups ranging from 16 to 39 years, the latter being indicative of their contamination, still before reaching the reproductive age. The case rate of primary contamination with toxoplasmosis among women aged 16-39 years did not exceed 0,43 %.

Key words: *toxoplasmosis, invasion, infection, contamination, reproductive age.*

Toxoplasmosis is present in every country and seropositivity rates range from less than 10 % to over 90 % [9]. The causative agent, Toxoplasma gondii, has a complex life cycle and is an important foodborne pathogen. Human infection can result from the ingestion or handling of undercooked or raw meat containing tissue cysts. Alternatively, it can result from direct contact with cats or from the consumption of water or food contaminated by oocysts excreted in the faeces of infected cats [7]. The global annual incidence of congenital toxoplasmosis was estimated to be 190 100 cases. High burdens were seen in South America and in some Middle Eastern and low-income countries [2].

Toxoplasmosis is one of the most common parasitic diseases of human, thus among veterinars and workers of farms occurred with high seropositivity [3, 4]. More than half of the adult population are infected with Toxoplasma in all countries around the world, and in regions with low sanitary culture contamination is almost absolute [8]. Anti-epidemic measures to combat this infection are ineffective because its distribution takes place without human intervention as a source of infection [6].

Usually in immune-competent individuals, toxoplasmosis runs without clinical symptoms and poses no threat to health especially the life of the infected. However, toxoplasmosis, along with other groups of TORCH infections are one of the main reasons for the growth of intrauterine fetal pathology [1, 8]. Moreover, the nature and severity of the involvement of the fetus does not depend on the severity of infection in the mother, and defined terms of infection. It is believed that the fetus in utero infection Toxoplasma can occur only if the primary infection during pregnancy or 3 months for it [5, 9]. Toxoplasma invasion in women at any other period of life (earlier than 3 months before pregnancy) is safe for future pregnancies as emerging non-sterile immunity, which will keep fetus from infection in case of re-infection or exacerbation of a woman in her chronic process [1, 5, 7]. Thus, the risk of possible defeat on fetal Toxoplasma are only in women in the serum of which within planning or during pregnancy, specific anti-toxoplasma antibodies are absent [10]. At the same time, existing methods and tools for laboratory diagnosis of toxoplasmosis do not always allow implicitly confirm or refute the fact the initial infection of pregnant and, therefore, to determine medical tactic. In these cases, the verification of the diagnosis become important and sometimes decisive results of epidemiological studies.

The purposes of the research were to determine the frequency of invasion by toxoplasmas in Bukovina's women of reproductive age and the frequency of their infecting during the pregnancy as well as to study factors, which assist to contamination of seronegative women during pregnancy and suggested the prevention measures.

Patients and methods

The current study conducted in Bukovina (Southern & Western part of Ukraine, Eastern European region) within 7 years (2000-2007) involved 5329 women aged 16-39 years: 4987 pregnant and 342 women in period of planning of pregnancy. Among examined there were 62,3 % (3320 persons) inhabitants of rural area and 37,7 % (2009 persons) inhabitants of urban areas.

Clinical, biochemical, epidemiologic, molecular-biologic and in addition instrumental methods of investigation used. With purpose of verification of diagnosis of Toxoplasma gondii invasion we took into consideration the results of

serological data – presence of specific antibodies IgM and IgG, finding of DNA of toxoplasma by PCR. For establishing of clinical form of this parasite invasion, the avidity index of IgG and ophthalmoscopy results had used.

Interpretation of got results conducted with taking into consideration the classification of toxoplasmosis and literature data according to clinical and epidemiological peculiarities and laboratory diagnostics of this pathology [11, 12].

The results were treated statistically.

Results and discussion

State of invasion by toxoplasma revealed in 4332 women, that means 81,3 % from all investigated. Nevertheless, in 4301 infected women (99,3 %) invasion caused by Toxoplasma gondii was long lasted and had latent course. In 9 patients (0,21 % according to all investigated) the chronical toxoplasmosis was diagnosed. Primary infection caused by toxoplasmas revealed during the research, in pregnant women were confirmed in 23 cases, that means 0,43 % from the general quantity of investigated and 0,53 % from the general amount of infected persons. However, on our opinion, the index of the primary infecting by toxoplasmas does not represent an actual epidemiology situation. Thus next step of the planned inspection of pregnant we investigated part of women with suspicion on an acute infectious process.

Frequency of toxoplasma-infected women of rural locality was 87,3 %, habitants of city – 71,4 %. Thus, among women which from birth lived in town (1647 persons), this index was yet lower – 68,36 %. In a counter-balance to it frequency of cases of the primary «fresh» infectious toxoplasma invasion among the habitants of city was considerably higher, than in rural locality (60,7 % against 39,3 %). In different age-dependent group frequency of exposure of seropositive women did not differ substantially (table 1).

Table 1.

Frequency of revealing of seropositive (IgG toxo +) women in different aged groups

Age	Total number of investigated	Quantity of seropositive	Quote of seropositive %
Up to 18 years	63	50	79,4±5,71
19-23 years	1991	1641	82,4±0,94
24-28 years	2387	1924	80,6±0,90
29 years and senior	888	717	80,7±1,32
Totally	*5329*	*4332*	*81,3±0,53*

It grounds to assume that the primary infecting takes place in more early periods of life of women possibly yet to achievement of reproductive age. Nevertheless, the cases of the primary infecting by *T. gondii,* which diagnosed during a supervision, had accurate age-old dependence. More frequent all the primary invasion of parasite was diagnosed in age-dependent groups 19-23 and 24-28 years (accordingly 65,2 % and 30,4 % cases). It was only found out one case (4,3 %) of the primary infecting for women junior 18 years and none for women senior 29 years and more. Without regard to that, different age-dependent groups differed after quantitative composition of inspected, frequency of cases of primary invasion of *T. gondii* in these groups was to a great extent predetermined by social conditions and life-being factors.

Mostly women with acute toxoplasmosis shortly before contamination had changed the place of residence as well as occupation, quality of nourishment, that were favorable for intensification of source of Toxoplasma and mechanism of transmission.

It was established, that the contact with source of invasion and alimentary route of transmission of toxoplasma were realized due to consumption of raw or undercooked meat products (cutlets, barbeque, strawberries) as main transmission factors in enrolled women (table 2).

Table 2

Frequency of revealing of different epidemiologic factors of toxoplasmosis in enrolled women (%)

Epidemiologic factors	Quantity of persons with noticed factor	Quote (%) of persons with noticed factor
House-keeping of cats or close contact with them in relatives during different periods of life	3447	80,3
Consumption of undercooked meat products	24	0,55
Consumption of raw meat or semi-finished product (foodstuffs)	763	17,6

In 15 % of seropositive women, it cannot to detect any of the provoking epidemiologic factor. However, in most of them in different age periods of life the occasions (facts) occur within which the contamination by Toxoplasma gondii parasite cannot excluded.

The deep study of epidemiologic factors determined that in 36,3 % infected, different duration contacts with source of invasion had taken place within 2 years and more before investigation. Notable, that in 41,4 % the duration of contact was more than 2 years, in some cases even 10-20 years, and only in 2,4 % the contact with *Toxoplasma gondii* occurred firstly and lasted not more than couple years. This received data verified idea about «old contamination» most part of seropositive women. And only 2,4 % of them must discussed from position of acute infectious process.

Epidemiologic provoking factors of distribution of parasite traced during different periods of life even seronegative women. Particular almost in 20 % of them the long lasted contacts with source were registered. In 2,2% contamination might realized by alimentary route due to consumption of undercooked meat foodstuffs. In accordance with epidemiology of toxoplasmosis, these women consisted the group of higher risk by toxoplasma invasion. By the deeper intensive research of epidemiologic peculiarities, it defined that certain social factors (high sanitary and hygienic culture, private hygienic enlightenment, following the consumption culture, sanitary and veterinary rules of keeping of cats) played an important role and can prevent the contamination of enrolled women.

Thus, in rural area cats have not possibility to enter to kitchen or other rooms where food stored. In a city contamination of cats by *T. gondii* completely excluded because they lived indoor and their ration excluded raw mice meat. At the same time determination of taste qualities of meals by these women was not accompanied with swallowing of raw forcemeat or other ready-to-cook foods. Assumed the mentioned above, we truly establish, that in distribution of toxoplasmosis, just next to epidemiologic factors, a considerable role is played by the factors of sanitary-hygienic orientation, namely social and sanitary-hygienic terms of dwelling, and sanitary culture of population.

Conclusions

1. Frequency of invasion caused by *Toxoplasma gondii* women of reproductive age of Bukovina, is 81,3 % with predominance of enrolled habitants of villages (87,3±0,58 %) above habitants of city (71,4±1,11 %).

2. In aged group 16-39 years the frequency of exposure of seropositive women for parasite substantially does not differ and testifies to their infection in more early periods of life, possibly yet to achievement of reproductive age. Frequency of cases of the primary infecting by Toxoplasma gondii among all enrolled investigated women within supervision period did not exceed 0,43 %.

3. Contamination by *T. gondii* in Bukovina's women of reproductive age taken place due to traditional ways and predetermined retaining in the appartment of young lady-cats, rarely by the consumption of the undercooked or unwell treated meat, or ready-to-cook foods.

4. Strict observance of personal, private hygienic rules as well as nourishment hygiene and sanitary and veterinary standarts of retaining of home pets, especially cats, allow getting a significant decreasing of infectious contamination risk of seronegative women within period of planning or during a pregnancy.

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ЕПІДЕМІОЛОГІЧНІ ОСОБЛИВОСТІ ТОКСОПЛАЗМОЗУ У ЖІНОК РЕПРОДУКТИВНОГО ВІКУ НА БУКОВИНІ

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Резюме. Визначено частоту інвазії токсоплазмами жінок репродуктивного віку Буковини, яка становить 81,3 % з переважанням ураження мешканок сіл – (87,3±0,58) % над мешканками міст (71,4±1,11) %.

У вікових групах 16-39 років частота детекції серопозитивних по токсоплазмозу жінок істотно не відрізняється та свідчить про їх зараження у більш ранні періоди життя, можливо, ще до досягнення ними репродуктивного віку. Частота випадків первинного інфікування токсоплазмами досліджуваних жінок упродовж часу спостереження не перевищувала 0,43 %.

Ключові слова: *токсоплазмоз, інвазія, інфікування, зараження, репродуктивний вік, Буковина.*

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ОСОБЛИВОСТІ ПЕРЕБІГУ ДЕЯКИХ ІНФЕКЦІЙНИХ ЗАХВОРЮВАНЬ НА ТЛІ ЛАТЕНТНОЇ ФОРМИ ХРОНІЧНОГО ТОКСОПЛАЗМОЗУ

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У результаті обстеження пацієнтів, інфікованих токсоплазмами, встановлено, що власне латентна форма хронічної стадії токсоплазмозу (ЛФ ХСТ) не має значущого впливу на якість життя пацієнтів.

ЛФ ХСТ не має негативного впливу на перебіг хронічного вірусного гепатиту, однак для хронічного гепатиту В (ХГВ), що перебігає на тлі ЛФ ХСТ, характерні менша частота виявлення активної вірусної реплікації, а також більша частота мікрополіаденіту і дискінезії жовчовивідних шляхів (ДЖШ), ніж при моноінфекції збудниками вірусних гепатитів.

Встановили, що інфікування токсоплазмами призводить до зростання ступеня тяжкості ДЖШ. Латентний токсоплазмоз є фактором, який сприяє розвиткові передусім гіпокінетичного типу ДЖШ.

Виявили, що ЛФ ХСТ не має статистично достовірного впливу на частоту клінічних проявів Нр-позитивної виразки шлунку, а вони залежать від тяжкості виразкової хвороби.

Попри відсутність значущого впливу інфікованості токсоплазмами на тяжкість сальпінгоофориту та його перебіг, інфікування T. gondii усе ж модифікує больовий синдром – достовірно частіше біль у животі іррадіює у крижі та розвивається тазовий плексит.

Ключові слова: *латентна форма хронічної стадії токсоплазмозу, хронічний вірусний гепатит, дискінезії жовчовивідних шляхів, виразкова хвороба шлунку, аднексит, тубуло-інтерстиціальний нефрит.*

Значення латентної форми токсоплазмозу, що не супроводиться видимими проявами, які погіршують якість життя пацієнта, в патології людини неоднозначне. Добре відомо, що саме ця форма інвазії є домінуючою. Досі не отримано даних про її вплив на тривалість життя пацієнтів без СНІДу, хоча значна роль реактивації саме латентного токсоплазмозу в генезі результатів ВІЛ-інфекції не береться під сумнів [1-4].